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INTELLECTUAL PROPERTY OFFICE OF THE PHILIPPINES

To All To Whom These Presents Shall Come:

This is to Certify that the annexed is a true copy from the records of this Office of the original, consisting of the Request for Grant of a Philippine Patent Specification & Claims; Abstract and Drawings (if there is any), as originally filed in:

Pending Patent Application of

ISIDRO UMALI URSUA
7 Sunrise St., SSS Village
Marikina City, Philippines

Appl. No. : **1-2003-000483** Filed: **Oct. 13, 2003**

Inventor(s) : **Isidro Umali Ursua**

for

Invention: **FLUID SPEED ACCELERATOR AND FLOATATION ASSEMBLY**

In witness whereof, I have hereunto affixed my hand and the seal of the Intellectual Property Office at Makati City, Philippines, this **10TH day of November, 2004**

EPIFANIO M. EVASCO
Director
Bureau of Patents

Attested:

EVELYN M. MANALAC
BOP, Records Officer III

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Doc. No.: BOP-200
Series of: 2004
Requested by: **Mr. Isidro U. Ursua (c/o IPSD)**

REQUEST FOR GRANT OF A PHILIPPINE PATENT

(The following is to be filled in by the Intellectual Property Office)
APPLICATION No. : 1-2003-000483

FILING DATE : October 13, 2003

Date of Receipt :

THE UNDERSIGNED HEREBY REQUEST GRANT OF A PHILIPPINE PATENT FOR THE SUBJECT APPLICATION.

Box No. I TITLE OF THE INVENTION

FLUID SPEED ACCELERATOR AND FLOATATION MEANS ASSEMBLY

Box No. II APPLICANT (WHETHER OR NOT ALSO INVENTOR). Use this box for indicating the applicant or if there are several applicants, one of them. If more than one person (includes, where applicable, a legal entity) is involved, continue in supplemental box.

The person in this box is (check one only): ☑ applicant and inventor ☐ applicant only

INTELLECTUAL PROPERTY OFFICE PAID DATE NOV 04 2003 AMOUNT 1,227.00 OR. NUMBER 699416

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Country of residence: PHILIPPINES

Box No. III INVENTOR/S. A separate sub-box has to be filled in in respect of each person. If the following two sub-boxes are insufficient, continue in the "Supplemental Box." (giving there for each additional person the same indications as those requested in the following two sub-boxes) or by using a "continuation sheet."

The person in this box is (check one only): ☐ applicant and inventor ☐ inventor only

Name and address:

If the person identified in this sub-box is applicant (or applicant and inventor), indicate also:
Country of nationality: Country of residence:

'03 OCT 13 P 3:30

The person identified in this sub-box is(check one only): ☐ applicant and inventor ☐ inventor only
Name and address :

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Box No. IV AGENT (IF ANY) OR COMMON REPRESENTATIVE (IF ANY); ADDRESS FOR NOTIFICATIONS (IN CERTAIN CASES) A common representative may be appointed only if there are several applicants and if no agent is or has been appointed: The common representative must be one of the applicants.
The following person (includes, where applicable, a legal entity) is hereby/has been appointed as agent or common representative to act on behalf of the applicant(s) before the Intellectual Property Office.

Name and address, including postal code:

N/A

Telephone number: (including area code) | Fax No.: | E-mail address:

Box No. V PRIORITY CLAIM (IF ANY). The priority of the following earlier application(s) is hereby claimed:

Country in which it was filed:	Filing Date (month, day, year)	Application No.
(1) NONE		
(2)		
(3)		

Box No. VI SIGNATURE OF APPLICANT(S) OR AGENT OVER PRINTED NAME(S)

ISIDRO UMALI URSUA

If the present Request form is signed on behalf of any applicant by an agent, a separate notarized power of attorney appointing the agent and signed by the applicant is required. If in such case it is desired to make use of a general power of attorney (deposited with the Intellectual Property Office), a copy thereof must be attached to this form.

Box No. VII CHECK LIST (To be filled in by the Applicant)

This application contains the following number of sheets::

1. request	1	sheets
2. description	16	sheets
3. claims	3	sheets
4. abstract	1	sheets
5. drawing(s)	9	sheets
Total	30	sheets

Figure number 7 of the drawings (if any) is suggested to accompany the abstract for publication.

This application as filed is accompanied by the items checked below

1. ☐ separate notarized power of attorney
2. ☐ copy of general power of attorney
3. ☐ priority document(s) (see Box No. V)
4. ☐ cheques for the payment of fees
5. ☐ other document(specify)

'03 OCT 13 P4:31

13, October 2003

The Director
Bureau of Patents
Makati City, Philippines

SUBJECT: Patent application

Title: Fluid Speed Accelerator and Floatation Means Assembly
Date Filed: 10-13-2003

Sir:

Herewith I am submitting my patent application composed of the technical field of the invention, background of the invention, summary of the invention, drawings, brief description of the drawings, abstract, and claims.

The application is submitted in triplicate copies.

Thank you and hope this can be prosecuted the shortest possible time.

Respectfully yours,

ISIDRO UMALI URSUA
Applicant

Fluid Speed Accelerator and Floatation Assembly

Technical Field of the Invention

This invention relates to power enhancement of prime movers, and in particular to prime movers which harnesses energy from free flowing fluid. The invention also extends to a method of increasing the generated energy and help increased output of those particular energy-generating devices.

Background to the Invention

Renewable and non-polluting sources of energy are currently in high demand. Traditional sources of generating power such as the combustion of fossil fuels, including coal, natural gas and oil, are becoming less and less favored due to their environmental disadvantages. The combustion of coal, oil or gas generates large quantities of carbon dioxide, oxides of sulfur and nitrogen, and other pollutant gases, which may contribute to global warming, acid rain, air pollution and a number of other environment and health damaging effects. World reserve of coal, oil and natural gas are also thought to be relatively low, and may run out in the foreseeable future.

Other sources of energy include nuclear fission, whereby atoms of radioactive elements are bombarded with a neutron source, which splits the radioactive element into an element or elements of smaller atomic mass, generating massive quantities of energy in the process. Unfortunately, the use of radioactive materials means that environmentally safe methods of disposal of waste are difficult to achieve. The radioactive waste generated is commonly stored in sealed containers and then buried in restricted access landfill sites or dumped at sea. There have been many occurrences of radioactive waste leaking from these containers and damaging the local environment. The damage caused by radioactive waste may be irreversible and the radiation generated by the waste may last decades. Thus, there is strong desire to produce or increase power production of non-polluting and renewable energy

sources. Known non-polluting and renewable energy sources include tidal-powered electricity generators, and wind powered electricity generators. These types of generators generally employ turbines that are designed to translate the linear motion of the wind or tidal water current into rotational motion of a turbine thru a central hub, which is connected to a suitable energy generator.

For a particular or specific turbine subjected to a free flowing fluid for power extraction purposes, power generated by the turbine, will entirely be dependent on the speed of the fluid when the mass is constant. Meaning, the higher the site speed of the flow of fluid, the higher is the power generated by a specific or particular turbine subjected to that fluid flow.

Therefore, the maximum power produced by turbines use for wind, river, or tidal flow power extraction is dictated by the site existing fluid speed, determined by the conditions set by the environment.

One of the aim of the present invention is to overcome or mitigate at least some of the disadvantages or limitations imposed by the existing environmental conditions, in particular the actual site speed available from the fluid or medium. The addition of a turbine casing or a Fluid Speed Accelerator designed to increase fluid speed and at the same time, directs the fluid to hit the turbine blades/buckets at the correct angle, maximizes power output that could not readily be available if the turbine where submerge naked, without the use of a casing, or a Turbine Speed Accelerator Assembly. Amplifying the actual existing site fluid speed at the time it hits the turbine blades/buckets will results to a dramatic increase of turbine power output as the speed or fluid velocity is squared in the Kinetic Energy equation.

In a vertical access turbine like an Annemometer, top view, half of the section , power is produced. The other half section the blades/buckets advances thru the incoming fluid generating counter-rotative forces which limits turbine efficiency.

The second aim of the present invention is to over come or mitigate at least some of the disadvantages or limitations imposed by this counter-rotative forces that greatly influence turbine efficiency.

The third aim of the present invention is to overcome or mitigate at least some of the problem of fluid speed control encountered in harnessing power from free flowing fluids.

Machines operating in the open seas are subjected to extreme environmental weather conditions. High waves, winds, typhoons, as well as tidal waves are major considerations in the design of the machine that can withstand these forces. Thus, these considerations, widespread use of the open sea for power extraction becomes prohibitive.

The fourth aim of the present invention is to overcome or mitigate at least some of the disadvantages or limitations imposed by those extreme environmental conditions.

Summary of the Invention

According to the present invention there is provided a turbine casing, or a Fluid Speed Accelerator Assembly for prime movers harnessing energy from free flowing fluid. The prime mover's Fluid Speed Accelerator Assembly is a tubular, rectangular box, or any other cross-sectional shape, open and flaring wide at both ends extremities. In a rectangular cross-section arrangement, the plates that are to be the bottom and top portion of the casing are cut identically flaring at both ends, while the plates that will become the sides of the casing, are long rectangular form only. The shape is tubular when formed, open at both ends. These open ends of the assembly, are the fluid entrances or exits, depending upon which way the fluid is coming from.

Length-wise, along the centerline of both the bottom and top plates, at the middle of the assembly, for vertical axis turbine, is where the shaft of a turbine is to be installed or

mounted. For a horizontal axis turbine, lengthwise, alone the centerline of both side plates, also middle of the assembly, is where the turbine mountings are to be located. Hereunto, it will be the casing of a vertical axis turbine that will be discussed, as design configurations are the same on both.

In actual manufacture, the Fluid Speed Accelerator Assembly is divided into five sections. Two identical Intake/Exhaust Units are cut at both open ends. Next are two identical Conducting Duct Units cut from both the resulting ends, the remaining middle portion becomes the Turbine-Housing Unit. Both sides of the Turbine-Housing Unit are double walled, with the inner walls, tapering sidewise towards both openings forming a Venturi. Center of the top and bottom plate of this Turbine-Housing Unit is where the vertical shaft of the turbine is to be located and held by bearing assemblies (not shown).

Between the Turbine Housing Unit and the Intake/Exhaust Unit, is the Conducting Duct Unit. It is a rectangular tubular section, open at both ends each with flanges for bolted connections to the flange end of the Intake/Exhaust Unit, with other end, bolted to the flange of the Turbine Housing Unit. This type of connections also applies to the other side of the Turbine - Housing Unit similar in arrangement outward to form a symmetrical assembly.

The small end of the Intake/Exhaust Unit has a flange that joins the flange of Conducting Duct Unit at one end. The other end is a Flaring Wide opening that serve as the fluid intake/exhaust depending upon which way the fluid is coming from.

In use, when free flowing fluid is allowed to enter at one end, it progresses inside and come out from the other end. The processes is reverse when the exit side becomes the entrance.

When the assembly is submerged in a free flowing fluid such that one end is facing the fluid flow, the fluid enters the Intake/Exhaust Unit. The slowly decreasing volume of fluid causes the fluid to increase in speed. As the fluid passes the Conducting Duct Unit, the fluid speed stabilizes. The Conducting Duct Unit delivers the fluid to the entrance of the Turbine-Housing

Unit where the fluid speed is further increased at the throat of Venturi. It is at this maximum speed, where maximum power is extracted.

As the fluid comes out of the Venturi's throat, the slowly increasing area causes the fluid to reduce in speed. The fluid is then deliverd to the Conducting Duct Unit of the other side to stabilize the fluid speed. As the fluid progresses inside the adjoining Intake/Exhaust unit, the slowly increasing area of the Intake/Exhaust Unit further reduce the speed to a little bit lower speed than the outside main stream fluid speed, this allows the main stream to suck the fluid coming out of the whole assembly.

Another variation of the Conducting Duct Unit is when a pivoted Flapper is added inside it. Adjacent to the wall, close to the forward flange of the Conducting Duct Unit, right side of the inflow during intake operation, a Pivot Pin is mounted attached to the bottom plate at one end and attached to the top plate at the other end. The Pivot Pin serve as support and pivot for a straight or a curvilinear rectangular plate called the Flapper. This pin allows the Flapper to swing in during inflow, or to swing out during outflow. Rollers (not shown) are provided along the bottom part of the Flapper for ease of operation.

In the Conducting Duct Unit, lengthwise, along the top and bottom plate centerline, close to the Conducting Duct Unit inner flange, an Arresting Pin is attached to the bottom plate at one end with the other end attached to the top plate. The Arresting Pin, arrest the inward swing of the Flapper during the inflow to limit the inward travel and hold it in place approximately at the center during the whole intake operation. The Arresting Pin, act as a stopper, and its location position the Flapper to directs the whole fluid mass or inflow toward correct angle of attack of the fluid in relation to the blades/buckets of the Turbine to maximize power extraction.

Diverting one half of the mass of the inflow, causes one half of the fluid path way to be blocked. This blockades create a reduce fuid speed downstream, along the blocked pathway, hence produces low resistance against the advancing or power subtractive blades/buckets, thereby increasing net power production due to lesser subtractive forces.

With the Flapper installed in the Conducting Duct Unit, during intake, the Flapper produces a choking effect to the already accelerated fluid flow coming out from the Intake/Exhaust Unit that feeds the intake side of the Conducting Duct Unit. The fluid speed is further increased inside the Conducting Duct Unit by the aid of the Flapper. The Turbine-Housing Unit which houses a Venturi maximize the speed. At the point of maximum fluid speed inside the Venturi, power is extracted before it is allowed to expand thru the increasingly widening area of the Venturi at the opposite end of the Turbine-Housing Unit. The added speed introduced to the flow of the fluid produces additional power that could be extracted by the turbine, compared to the power it could produced without the use of the Fluid Speed Accelerator Assembly.

As the fluid enters the adjoining Conducting Duct Unit, the fluid hits the inboard face of the Flapper which is at closed position resting on the Arresting Pin. The pressure exerted on the inboard face, pushes the Flapper to slide open, allowing more room for the fluid to be guided smoothly by the Flapper thru the Intake/Exhaust Unit outlet. Ultimately, the fluid joins the mainstream running outside the whole assembly. Thus, the speed of the fluid outside the Turbine Speed Accelerator Assembly is multiplied several times before power is extracted. Directing and concentrating the mass of high speed fluid where it is most needed, and at the same time reducing the fluid speed encountered by the advancing blades/bucketts, minimizes the subtractive forces thereby appraiseably increases turbine effeciency.

During operation, when the fluid flow change its direction, fluid enters the exhaust end. The flapper at this time at this end is at open position, instead of the fluid flow pushing the Flapper against the inward face, it is now push at the opposite side or outward face of he Flapper by the incoming fluid flow coming from this end. This allows the Flapper to swing inward and pivot towards the close position to be stopped and rest against the Arresting Pin. The Flapper remains closed all the time during in-take operation to create a choking and blocking effect to increase fluid speed at one section, and a low speed at the blocked section. The fluid, now inside the Conducting Duct Unit, is guided by the Flapper to the

Turbine-Housing Unit for power extraction. The process cotinually reverses every time the fluid direction reverses.

What was previously discussed was the principle of operation of the Flapper if it were allowed to function by itself. When the Flapper is controlled automatically, it could be used as a method to regulate the fluid speed entering the Turbine Housing Unit, thereby resulting to a method of controlling the turbine revolution or rpm.

Another embodiment of the preferred invention is an automatic control of the Flapper using hydraulic motors powered by hydraulic pumps or Hydraulic Cylinders/Canisters thru a gearbox to provide turbine RPM control. Hydraulic motors are use to operate and control the speed of the turbines by controlling the speed of the fluid flow going inside the unit. This is accomplished by manually controlling the operation of the Flapper thru hydraulic motors (not shown). Closing the Flapper against the Arresting Pin provides maximum choking effect and directs the fluid to hit the blades/buckets at optimum angle. This produces maximum fluid speed that produces maximum turbine RPM. Opening the Flapper reduces RPM as it directs the fluid not to hit the turbine blades/buckets, instead, it is directed to hit the wall. At the same time, the fluid passage is drastically restricted between the Flapper tip and the wall restricting or controlling the fluid flow. This restriction limits the quantity of fluid entering the system, thus, the restriction results to a slower turbine RPM.

The Flapper is now connected to a gearbox driven and controlled by hydraulic motors (not shown) to control the amount of closing and opening of the Flapper, hence, turbine revolution/speed could be automatically controlled.

When the ocean is use as the medium, the Fluid Speed Accelerator Assembly could be mounted or supported by permanent pylons (not shown) that are permanently embedded into the ocean floor. Or, suspended without permanently situated infrastructures by the use of at least one Floatation Unit that work under the inverted cup principle. The trapped air in the Floatation Unit/s holds the Fluid Speed Accelerator and Floatation Assembly afloat. At

least, one Air Release Control Valve and at least, one Air Charging Valve are mounted on top of each Floatation Unit to released or trapped the air inside the Floatation Units. Charging or releasing air inside the Floatation Units will make the entire Fluid Speed Accelerator and Floatation Assembly float or sink, or to float under water at whatever depth is so required.

At submerged position the Air Relief Valve is closed. Water is present inside the Floatation Units, partly or completely occupying the space inside it, depending at which depth it is desired to float. When compressed air is re-introduced thru the Air Charging Valves into the Floatation Units, the air entering inside the Floatation Units pushes the water inside it, out thru the open lip at the bottom of the Floatation Units to make the Fluid Speed Accelerator and Floatattion Assembly float.

To hold the Fluid Speed Accelerator and Floatation Assembly at approximately the same position, steel cables with calculated slack are attached to at least two anchors located at two different positions on the seabed. Attached to the fore is at least one Anchor Cable, aft of the Fluid Speed Accelerator and Floatation Assembly the other Anchor Cable/s is/are attached. Thus the Fluid Speed Accelerator and Floatation Assembly is teetered at both fore and aft and is allowed to move forward or backward depending on the direction of the tide flow and is prevented to turn around to avoid fowling of the electrical cables, but the opening of the Fluid Speed Accelerator Assembly will of course always be facing against the flow of the fluid.

Brief description of the Drawings

For a better understanding of the invention, and to show how the embodiments of the same may be carried into effect, reference will now be made to the accompanying diagrammatic drawings in which:

Figure1 illustrate a top view of the preferred embodiment of the Fluid Speed Accelerator Assembly of the invention.

Figure 2 illustrate an isometric view of the preferred embodiment of the Fluid Speed Accelerator Assembly of the invention.

Figure 3 illustrate a top view of the second preferred embodiment of the Fluid Speed Accelerator Assembly of the invention.

Figure 4 illustrate an isometric view of the second preferred embodiment of the Fluid Speed Accelerator Assembly of the invention.

Figure 5 illustrate a perspective view of the Floatation Assembly of the third preferred embodiment of the Fluid Speed Accelerator Assembly of the invention.

Figure 6 illustrate a perspective view of the Fluid Speed Accelerator and Floatation Assembly of the third preferred embodiment of the Fluid Speed Accelerator Assembly of the present invention, when the Fluid Speed Accelerator Assembly is mounted in the Floatation Assembly.

Figure 7 illustrate a perspective view of the Fluid Speed Accelerator and Floatation Assembly of the third preferred embodiment of the Fluid Speed Accelerator Assembly of the present invention, when the Fluid Speed Accelerator Assembly is mounted in the Floatation Assembly .

Figure 8 illustrate a side view of the Fluid Speed Accelerator and Floatation Assembly of the third preferred embodiment of the present invention, afloat and anchored on the sea bed,

Figure 9 illustrate a side view of the Fluid Speed Accelerator and Floatation Assembly of the fourth preferred embodiment of the present invention, submerged and anchored on the sea bed with the Hatch Cover closed.

Figure 10 illustrate a top view of a Vertical Access/Turbine 62 in relation with the present invention , showing the blades/buckets behaviour as it operates in a moving fluid, showing the subtractive forces generated as the blades/buckets advances thru the incoming fluid.

Detailed Description of the Preferred Embodiment of the Invention

Referring firstly to figure 1 and figure 2, a preferred embodiment of a Fluid Speed Accelerator Assembly 2, comprises a Turbine Housing Unit 4, two Conducting Duct Units 6 and 10, and two Intake/Exhaust Units 8 and 12. The cross-section cut across the length-wise direction of the Fluid Speed Accelerator Assembly 2 is rectangular in this example, but could also either be square, oval, or circular.

The Turbine Housing Unit 4 is a hollow box open at both ends with a removable top plate 60. The removable Top Plate 60 is the access when installing Turbine 62 inside this box. It is provided with inside Double Walling 14 along each side, mounted perpendicular from the Bottom Plate 16, originating and attached vertically to the Turbine Housing Unit 4 opening Flange 18 and Flange 20 of the Turbine Housing Unit 4. The shape of the Double Walling 14 is half an ellipse reckoned from the top view, the two Vertical Walling 14, together forms a Venturi.

At the center of Top Plate 60 and Bottom Plate 16, the top and bottom bearing support (not shown) of Turbine Shaft 22 of the vertical axis Turbine 62 is located. Proper clearances are set between Double Wall 14 and the blades of the rotating Turbine 62.

The Conducting Duct Units 6 and 10 are just ducts or boxes open at both ends. The Conducting Duct Units 6 and 10 joins the Turbine Housing Unit 4 Flanges 18 and 20 as

against Flanges 24 and 38 of the Conducting Duct Units respectively. Both the other end of the Conducting Duct Units 6 and 10 joins the Intake/Exhaust Units 8 and 12 Flanges 28 and 30 respectively. The Intake/Exhaust Units 8 and 12, both has a wide flaring End 32 and 58 that serves as an enlarged opening for intake or exhaust for the fluid during operation.

Use of the preferred embodiment of Figures 1 and 2 will now be described.

As the whole Fluid Speed Accelerator Assembly 2 is submerged and oriented into a free moving fluid such that the Opening Hole 32 of the Intake/Exhaust Housing Unit 8 is directly facing the incoming fluid, the fluid enters the Opening Hole 32, progresses inside and come out of the Opening 58 to join the fluid flow passing outside the Fluid Speed Accelerator Assembly 2.

During operation, when the fluid enters Opening 32, the fluid progresses inside the Intake/Exhaust Unit 8. The cross-sectional area of the passage is gradually reduced to accelerate to increase the fluid speed. The fluid is then delivered and enters into the Conducting Duct Unit 6 to smoothen the fluid flow before it is allowed to enter the Turbine Housing Unit 4. The Venturi inside the Turbine Housing Unit 4 further increases the fluid speed delivered by the Conducting Duct Unit 6; at this maximum fluid speed, power is extracted.

The high-speed linear motion of the fluid inside the Turbine Housing Unit 4 is converted by the Turbine 62 into rotational motion of Shaft 22, and is transmitted to a Gearbox 50, which amplifies the rotational speed, then is transmitted to an Alternator 52 that convert it into electrical output.

The fluid, after hitting the blades of Turbine 12, is allowed to reduce speed as the fluid passes thru the Venturi's throat inside the Turbine Housing Unit 4. The fluid is then smoothen inside the Conducting Duct Unit 10 before it enters the Intake/Exhaust Housing Unit 8. The progressively widening area reduces the fluid speed further as it continue to pass

into the Intake/Exhaust Housing Unit 12. The fluid coming out at Opening 58, once again joins the flow of fluid passing outside the Fluid Speed Accelerator Assembly 2.

Thus, the use of the Fluid Speed Accelerator Assembly 2 increases the prevailing fluid speed outside the Fluid Speed Accelerator Assembly 2, to produce an increase of available power for the prime mover/turbine.

The process is reverse when the fluid flow changes its direction, this time entering thru Opening 58 of the Intake/Exhaust Housing Unit 12, to come out thru Opening 32 of the Intake/Exhaust Unit 8.

Use of the preferred embodiment of figures 3, 4 and 10 will now be described.

Referring now to Figures 3 and 4, a second embodiment of the Fluid Speed Accelerator Assembly 2 includes all the elements of the embodiment described for Figures 1 and 2, but include means to control the fluid flow entering the Turbine Housing Unit 4, by the used of a Flapper 34 and 40 installed inside the Conducting Duct Units 6 and 10. The Flappers 34 and 40 are either straight rectangular plates, or are curvelinear plates, shaped to form a smooth curvature to direct, guide and increasedthe speed of the fluid. When the Intake/Exhaust Unit 8 opening 32 is facing the fluid flow, the entering fluid increases in speed as it passes thru the narrowing space of the Intake/Exhaust Unit 8. The fluid enters the Conducting Unit 6, passing along the Outward Face 90 of the Flapper 34, the fluid speed increases further to hit the blades/buckets of Turbine 62 to produce maximum speed for optimum power extraction. Afterwhich, the fluid speed is reduced inside the Turbine Housing Unit 4 as it progresses outward as a result of the venturis' effect of the Double Walling 14. Inside the Conducting Duct Units 6 and 10 are Pivot Pins 46 and 48, Arresting Pins 42 and 44, use by the Flapper 34 and 40 respectively, as pivots and as closing travel arresters.

Downstream of the Flapper Inner Surface 92, the fluid path is blocked. The block produce a slower fluid speed encountered by the advanacing blades/buckets resulting to a much lower subtractive forces; hence, enhances the Net Power that could be extracted.

The fluid output of the Turbine Housing Unit 4 enters the Conducting Duct Unit 10 to impinge on the inward face 56 of the Flapper 40 that is resting against the Arresting Pin 44. The Flapper 40 then slide open by the aid of rollers (not shown) attached at the bottom edge of the Flapper 40, pivoting on the Pivot Pin 48. This allows the fluid to reduce speed some more, so it could now easily pass thru the Intake/Exhaust Unit 12, thru Opening 58, and be sucked by the fluid flowing outside the Fluid Speed Accelerator Assembly 2.

When the fluid flow reverses, the now opened Flapper 40 will be impinged on the Outward Face 54 by the incoming fluid. Flapper 40 then will be pushed to move inside towards the close position, until the closing motion is stopped as the Inward Face 56 of the Flapper 40 hits the Arresting Pin 44. The cycle will then keep repeating every time the direction of the fluid flow reverses.

Use of the preferred embodiment of figures 5, 6, 7 and 8 will now be described.

Referring now to Figures 5, 6, 7, and 8, a third embodiment of the Fluid Speed Accelerator Assembly 2 of the invention, includes all elements described in Figures 3 and 4, but include Floatation Means Assembly 80 to make the Fluid Speed Accelerator Assembly 2 float. The Floatation Means Assembly 80, is composed of at least one Floatation Unit 82, preferably, at least two Floatation Units 82, separated by Super Structure and Flooring 84, such that when the two Floatation Units 82 are bolted and joined, the Fluid Speed Accelerator Assembly 2, will be mounted to straddle the Floatation Means Assembly 80, sandwiching the whole body lengthwise. When bolted to the super structure and Flooring 84, the Fluid Speed Accelerator Assembly 2 becomes an integral unit of the Fluid Speed Accelerator and Floatation Assembly 94. Mounting is made such that, the Fluid Speed Accelerator Assembly 2 is lower

than the top of the Super Structure and Flooring 84, suitably to make it totally underwater while the super structure and Flooring 84 is well above the water.

On top of the Super Structure and Flooring 84 is where the turbine Gearbox 50, Alternator 52, Hydraulic Jacks 70, compress air containers, compressors, hydraulic motors, electrical accessories and controls (all not shown) are located. All of these accessories are covered with a Clam Shell 64, such that when closed, Hinges 66 and Latch 68 holds the Clam Shell 64 in-placed. Clam Shell 64 when close protect the Alternator 52 and other required accessories from the environment during operation. The Clam Shell 64 is attached by Hinges 66 to the Super Structure and Flooring 84 to allow Clam Shell 64 to be opened or closed at will, by means of Hydraulic Jack 70.

In use, when the Fluid Speed Accelerator and Floatation Assembly 94 is place on a free moving fluid such as a river or an Ocean, Fluid Speed Accelerator and Floatation Assembly 94 will float. The whole Super Structure 84 will be under the water surface except for the Super Structure Flooring 84, which houses the Gearbox 50, Alternator 52, together with the electrical accessories (not shown), are all above the water surface.

To prevent Fluid Speed Accelerator and Floatation Assembly 94 being carried by the flowing water, Mooring Chains 76 and 78 are attached to both fore and aft Mooring Blocks 86 and 88 embedded on the seabed. This mooring arrangement provide an ample means to allow the Fluid Speed Accelerator and Floatation Assembly 94 to move only to the left or to the right as dictated by the direction of the water flow.

Referring now to figures 8 and 9, the fourth embodiment of the invention includes all the elements of the embodiment described for figures 5, 6, 7, and 8, but include means to submerge the whole Fluid Speed Accelerator and Floatation Assembly 94 to continuously operate, this time under the surface of the water.

At least one mechanically/electrically or pneumatically controlled Discharge Valve 72 and at least one mechanically/electrically or pneumatically controlled Charging Valve 74 is installed on the top surface of the Floatation Unit 82.

In use, when the whole system is operating, the rest of the Floatation Means Assembly 80 is submerge except for the Flooring 84 of the Super Structure that is above the water surface.

During bad weather condition water surface becomes rough. The continuously buffeting disturbances cause by the waves, disrupts the smooth operation of the system. To avoid the possibility of a mooring break or destruction, the whole Fluid Speed Accelerator and Floatation Assembly 94 is required to submerge to a suitable water depth.

Before diving is initiated, the Clam Shell 64 is close thru the use of Hydraulic Jack 70 and held rigidly close by the aid of the Latch 68 and Hinges 66. The airtight Clam Shell 64 prevents the water from reaching Gearbox 50 and Alternator 52.

At floating position, the trap air inside the Floatation Unit 82 that makes the Fluid Speed Accelerator and Floatation Assembly 94 float is vented out to the atmosphere thru the mechanically/electrically or pneumatically controlled Discharge Valve 72. Allowing the release of the trap air inside the Floatation Unit 82, the space vacated by the air permits the water to enter thru the open lip at the bottom of Floatation Unit 82. As the buoyancy is lost, the Fluid Speed Accelerator and Floatation Assembly 94 starts to sink totally. The water depth where the Fluid Speed Accelerator and Floatation Assembly 94 is allowed to sink is controlled by the amount or quantity of the trap air released.

At submerge position, with the Discharge Valve 72 closed, a battery of compress air canisters (not shown) charges the Floatation Units 82 thru the Charging Valves 74. The water occupying the space inside the Floatation Units 82 is force out by the entering air, and the water is then push out thru the open bottom at the lip of the Floatation Units 82. As the air space increases, the buoyancy of the Fluid Speed Accelerator and Floatation Assembly

94 starts to increase. The quantity of air charge determines the level at which Fluid Speed Accelerator and Floatation Assembly 94 will float.

The reader's attention is directed to all papers and documents which are filed concurrently with this specification in connection with this application and which are open for public inspection with this specification, and the content of all such papers and documents are incorporated herein by references. All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), maybe replaced by alternative features serving the same, equivalent, or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the feature disclosed in this specification (including any accompanying claims, abstracts, and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

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ABSTRACT

The present invention provides a Fluid Speed Accelerator Assembly 2 for power enhancement of prime movers, and in particular to prime movers that harnesses energy from free flowing fluids. The Fluid Speed Accelerator 2 comprises a Turbine Housing Unit 4, two Conducting Duct Units 6 and 10, and two Intake/Exhausts 8 and 12, when assembled on the Floatation Means 80, together form the Fluid Speed Accelerator and Floatation Assembly 94, make possible the efficient harnessing of power from free moving fluids. When the Fluid Speed Accelerator and Floatation Assembly 94 is located in a free flowing fluid, properly anchored, power generated by any Turbine could be appraise ably increased as compared to the power generated by Turbines without the use of it. System operation will also be improved, becoming impervious to the existing weather disturbances or conditions that will disrupt a continuous system operation.

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CLAIMS

1. A Fluid Speed Accelerator Assembly (2) for power enhancement for prime movers harnessing power from free moving fluids, comprising of a Turbine Housing (4), two Conducting Units (6) and (10), and two Intake/Exhaust Units (8) and (12), with cross section cut across the lengthwise direction as either rectangular, square, oval or circular, wherein free flowing fluid enters opening (32) of the Intake/Exhaust Unit (8), increasing the fluid speed thru a decreasing passage area, enters the Conducting Unit (6) to smoothen the fluid flow before it is allowed to enter the Venturi inside Turbine Housing Unit (4), where at this maximum fluid speed power is extracted.

2. A Fluid Speed Accelerator Assembly (2) as claimed in claim 1, wherein the flow of fluid coming out from the Venturis' widening fluid passage reduces in speed, enters the Conducting Unit (10) to stabilize the fluid speed, enters the increasingly widening fluid passage of the Intake/Exhaust Unit (12) to reduce the fluid speed and to be sucked out by the fluid stream passing outside the Fluid Speed Accelerator Assembly (2).

3. A Fluid Speed Accelerator Assembly (2) as claimed in claim 1 and 2, wherein the process reverses as the flow of fluid reverses, this time entering Opening (58) of Intake/Exhaust Unit (12) to exit from the Opening (32) of Intake/Exhaust Unit (8).

4. A Fluid Speed Accelerator Assembly (2) as claimed in any preceding claim, wherein includes a means to control the fluid flow entering the Turbine Housing Unit 4, by the use of Flappers 34 and 40 installed inside the Conducting Units 6 and 10 respectively, that are either straight rectangular or curvilinear plates, shaped to form a smooth curvature to increase further the fluid speed of the fluid coming in from the corresponding Intake/Exhaust Unit, and direct the high speed fluid towards the power producing Blades/Buckets at the right direction before power is extracted.

5. A Fluid Speed Accelerator Assembly (2) as claimed in any preceding claim, wherein the Conducting Unit (6) has a Pivot Pin (46), Arresting Pin (42), a Flapper (34) with outboard Face (90) and inboard Face (92), and the other Conducting Unit (10) has a Pivot Pin 48, Arresting Pin (44), a Flapper (40) with outboard Face (54) and an inboard Face (56), with both Flapper (34) and (40) pivoted to allow it to slide open or close as the fluid flow dictates, restrained by the Arresting Pins at close position.

6. A Fluid Speed Accelerator Assembly (2) as claimed in any preceding claim, wherein during the close position of the Flapper, downstream of the inboard Face, the fluid path is blocked, resulting to a much reduced fluid speed encountered by the advancing blades/buckets resulting to a much lesser subtractive force thereby increasing Turbine efficiency.

7. A Fluid Speed Accelerator Assembly (2), as claimed in any preceding claim, wherein includes a Floatation Means Assembly (80), composed of at least one Floatation Unit (82), preferably, at least two Floatation Units (82), separated by Super Structure and Flooring (84), such that when the two Floatation Units (82) Are bolted and joined, the Fluid Speed Accelerator (2), will be mounted to straddle the Floatation Means Assembly (80), sandwiching the whole body lengthwise.

7. A Fluid Speed Accelerator Assembly (2) as claim in any preceding claim, Wherein when mounted on the Floatation Means Assembly (80), make the Fluid Speed Accelerator Assembly (2) become an integral part of the Fluid Speed Accelerator and Floatation Means Assembly (94), the whole assembly floats when place on body of waters such as the Ocean.

8. A Fluid Speed Accelerator and Floatation Means Assembly (94) as claimed in any preceding claim, wherein mounting is made such that, the Fluid Speed Accelerator Assembly (2) is lower than the top of the Super Structure and Flooring (84), suitably to make it totally under water while the Super Structure and Flooring Assembly (84) is well above the water surface level.

9. A Fluid Speed Accelerator and Floatation Means Assembly (94) as claimed in any Preceding claim, wherein a Clam Shell (64) is provided with Hinges (66) and Latch (68) attached as a provision to cover all electrical controls and accessories to protect these items during underwater operation.

10. A Fluid Speed Accelerator and Floatation Means Assembly (94) as claimed in any preceding claim, wherein the Floatation Units (82) which comprises the Floatation Means Assembly (80), are provided with at least one mechanically/electrically/pneumatically/ hydraulically controlled Discharge Valve (72) and at least one mechanically/electrically/pneumatically/hydraulically controlled Air Charging Valve (74), installed on the top of each Floatation Units (82).

11. A Fluid Speed Accelerator and Floatation Means Assembly (94) as claimed in any Preceding claim, wherein the Floatation Units (82) work under the inverted cup principle, allowing the Fluid Speed Accelerator and Floatation Means Assembly (94) to float with the Super Structure and Flooring above the water surface level while the Fluid Speed Accelerator Assembly (2) is well under water, depending upon the amount of trapped air present in the Floatation Units (82).

12. A Fluid Speed Accelerator and Floatation Means Assembly (94) as claim in any preceding claim, wherein the whole assembly could be made to be totally submerged by discharging the of trapped air in the Floatation Units (82), and be made to float by air charging the Floatation Units (82) to vacate the water inside.

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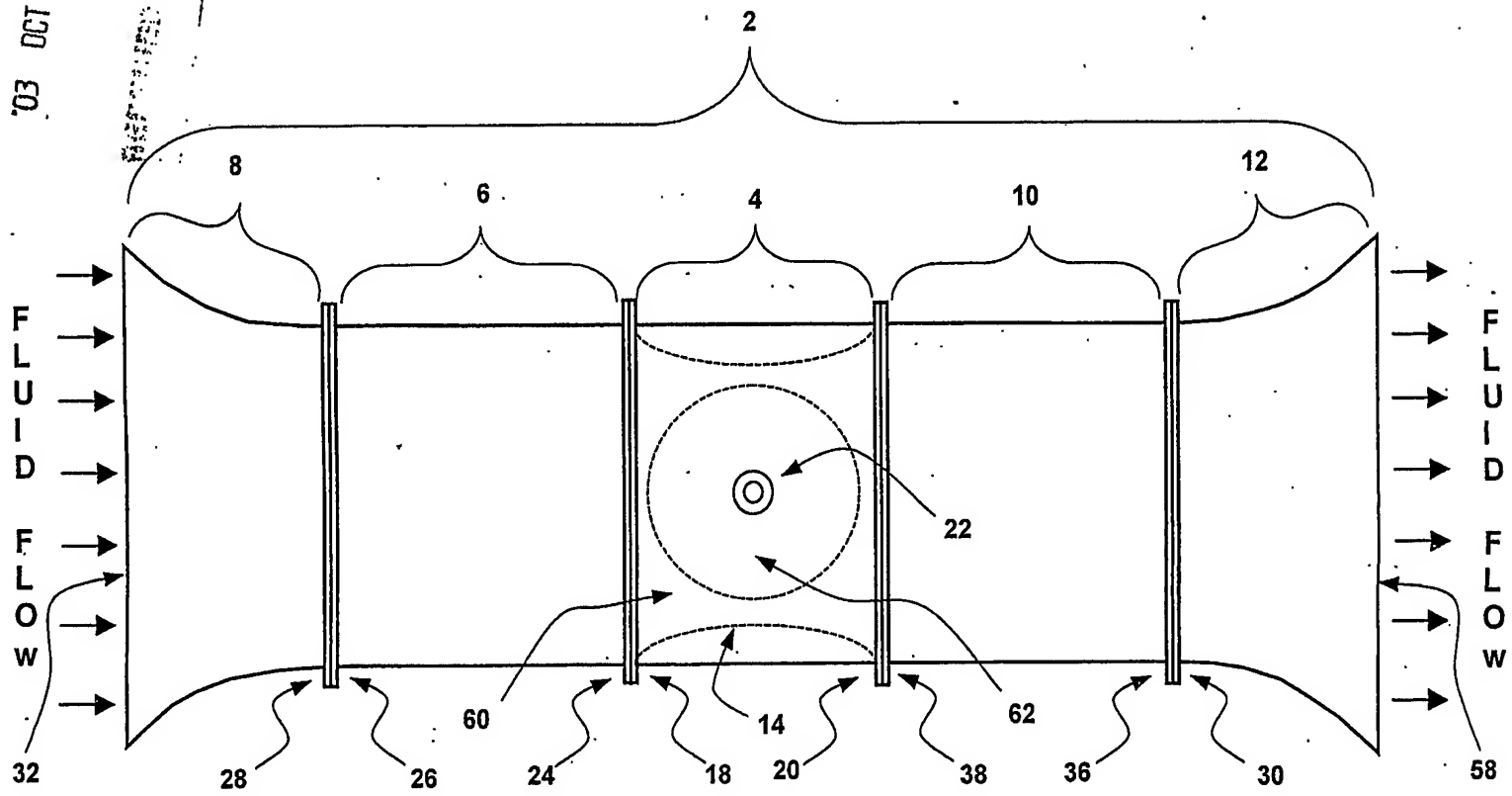

Figure 1

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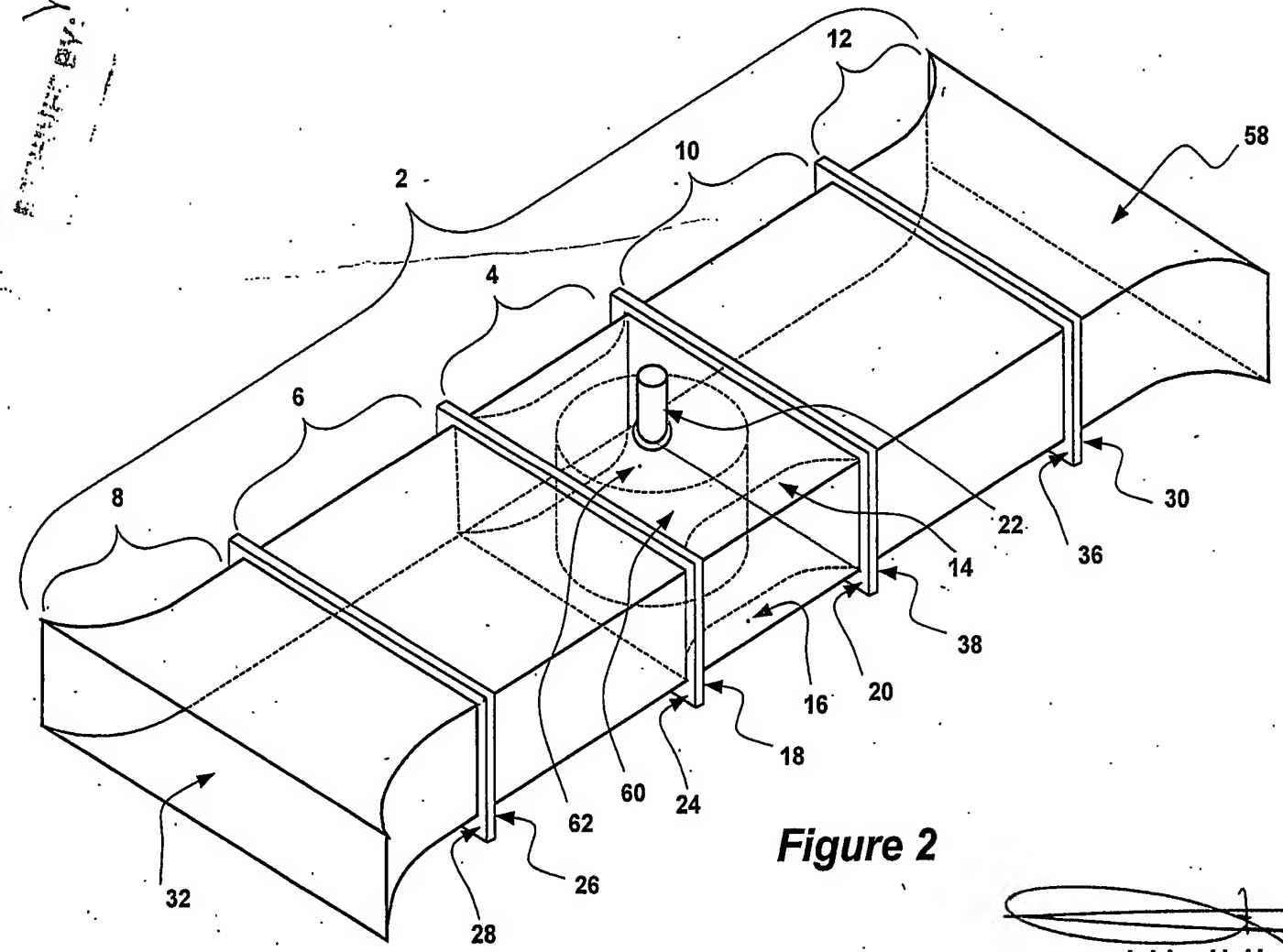

Figure 2

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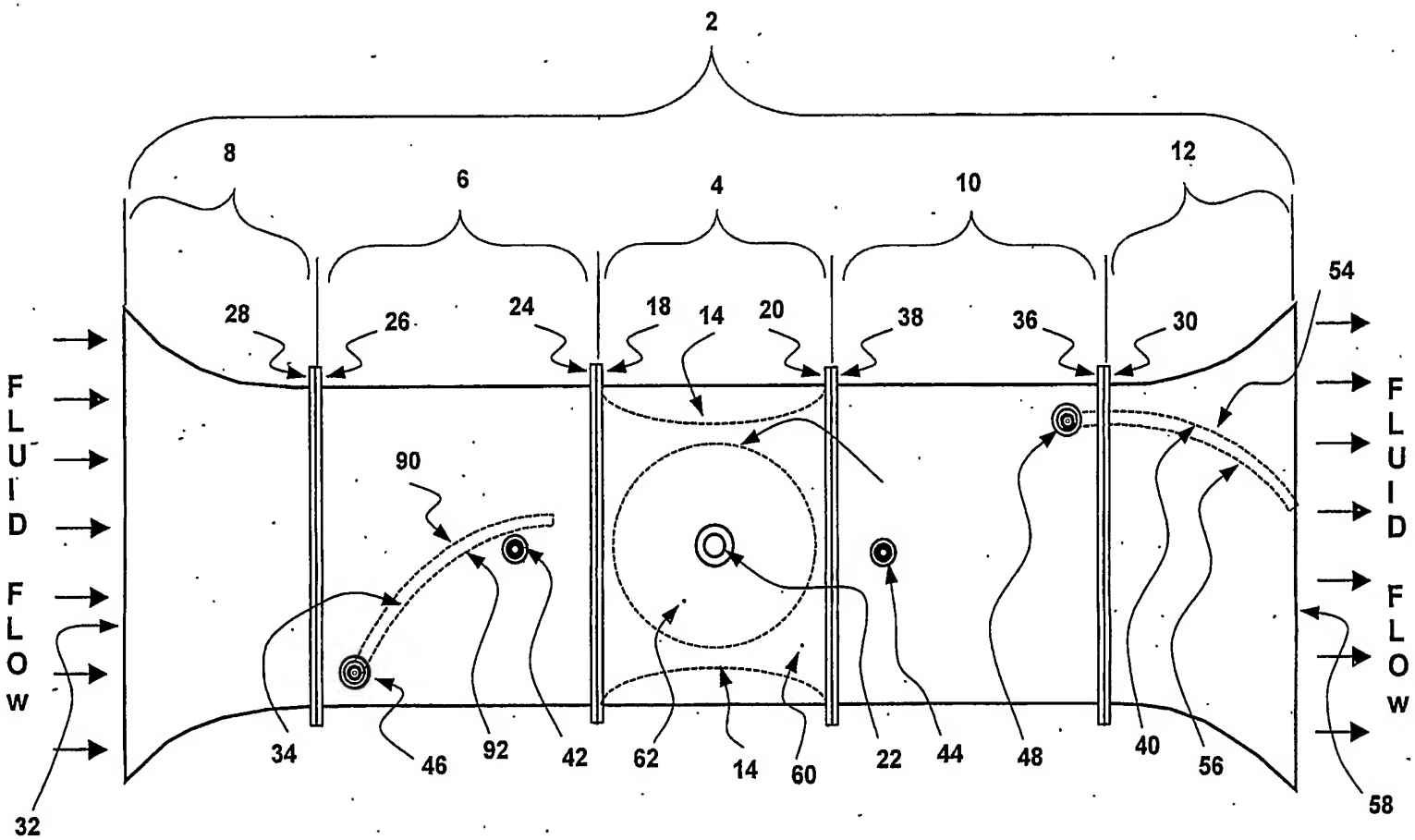

Figure 3

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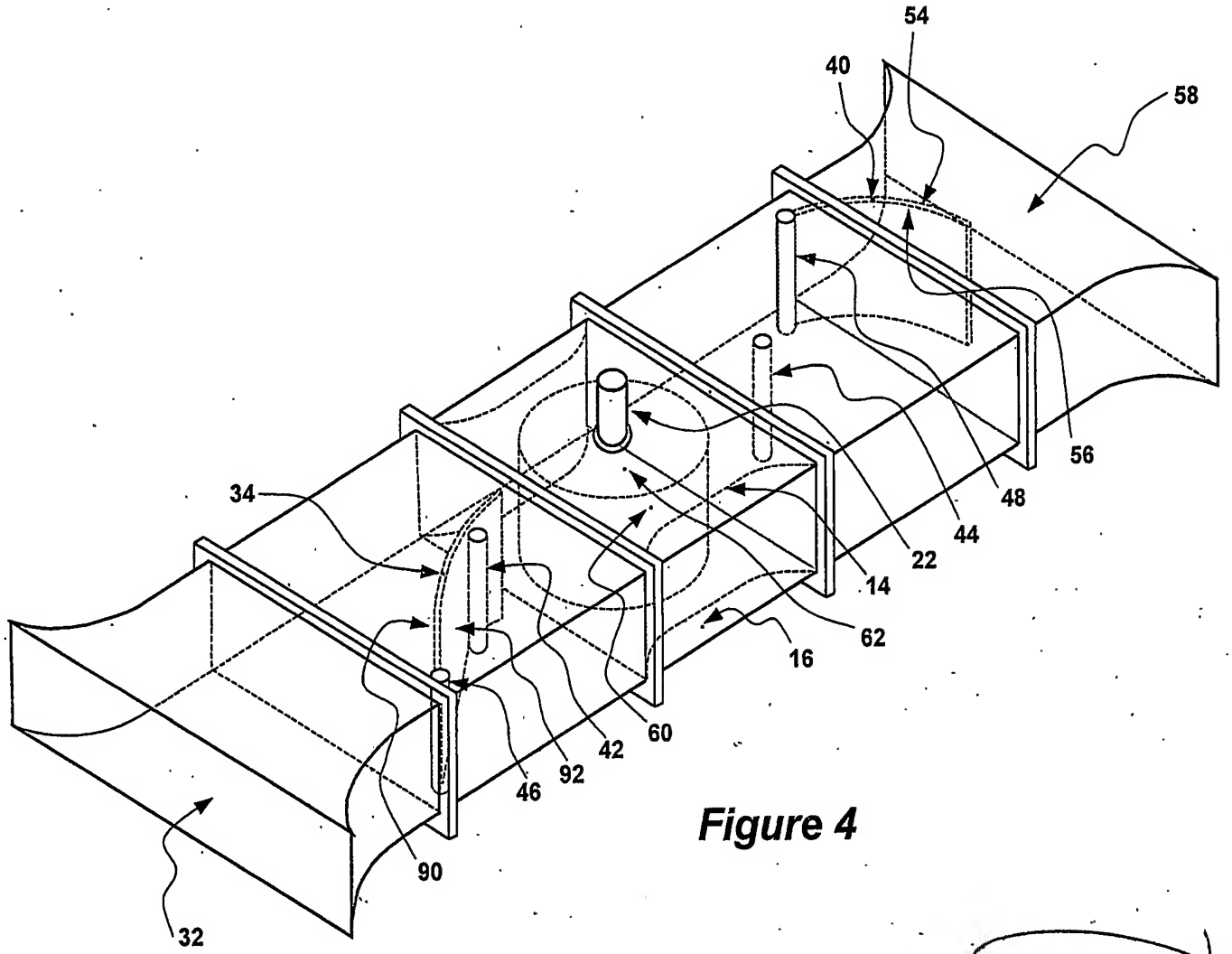

Figure 4

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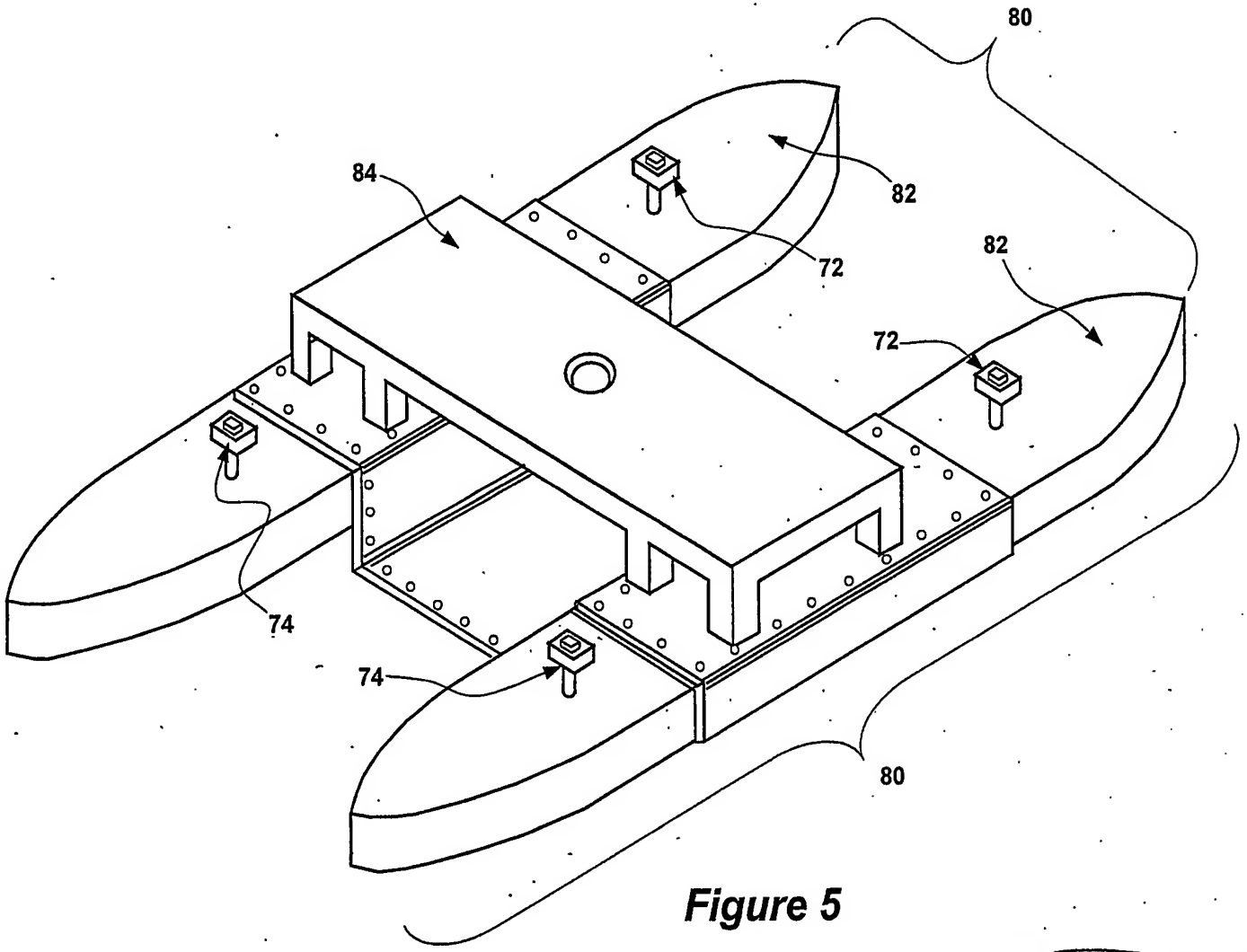

Figure 5

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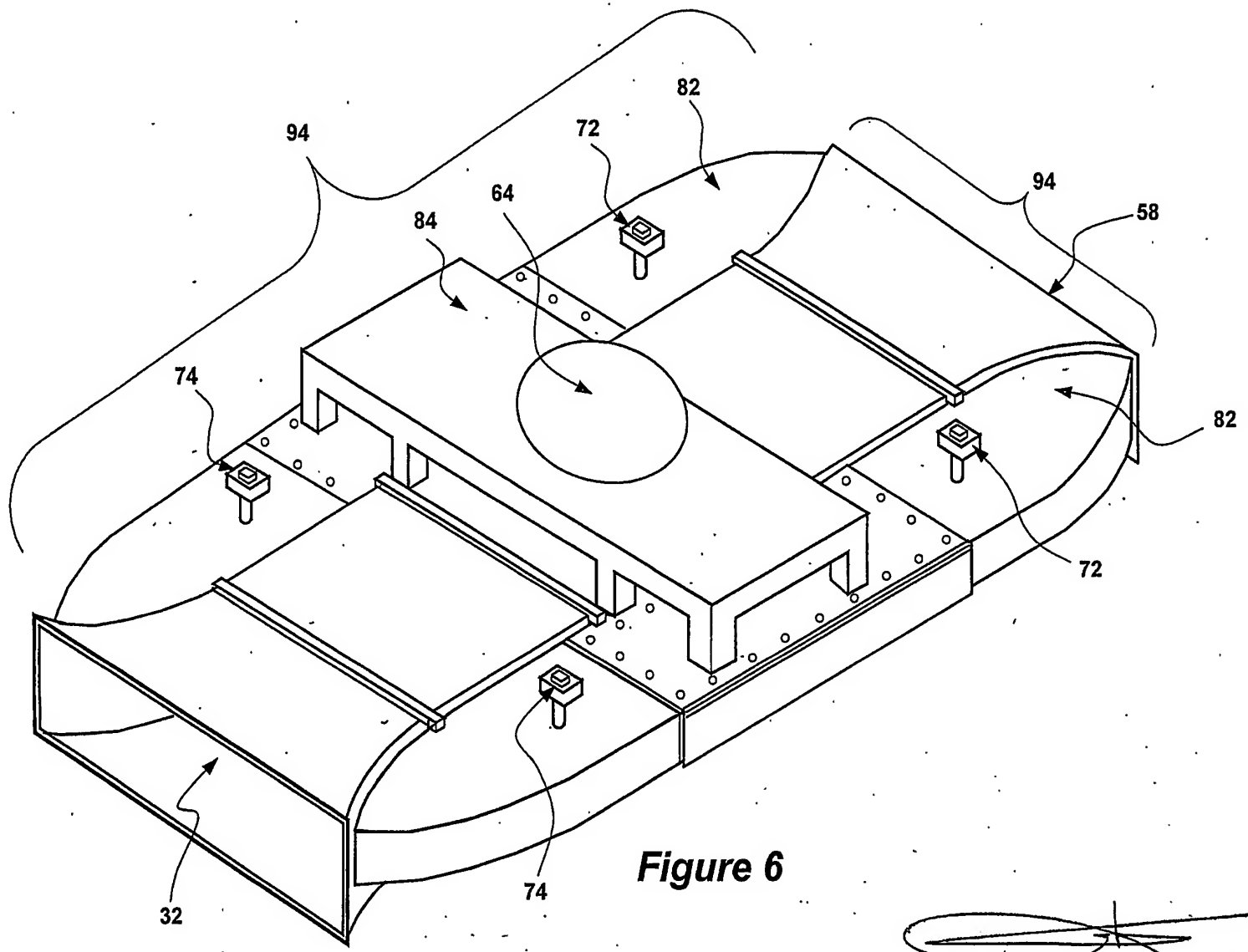

Figure 6

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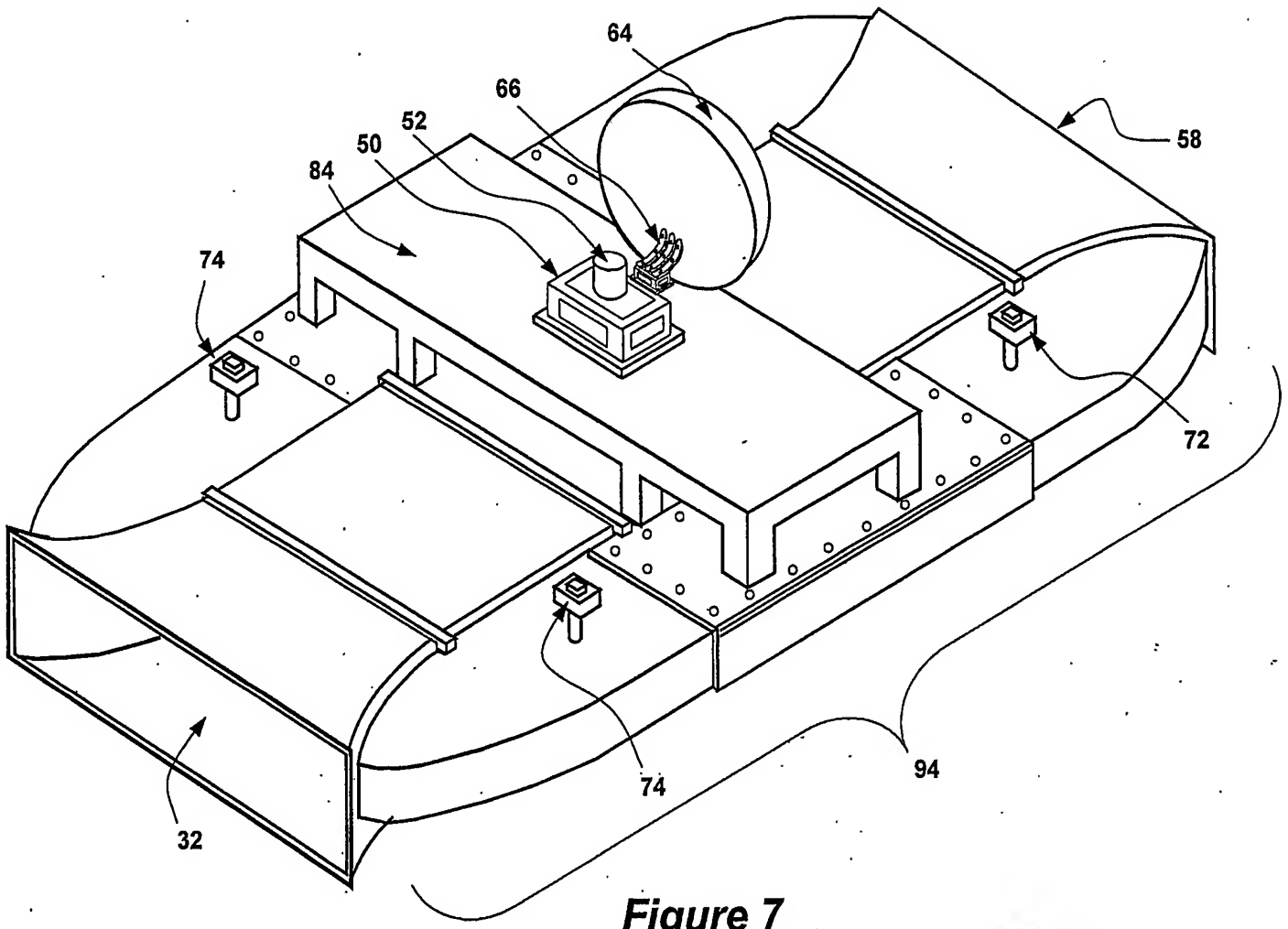

Figure 7

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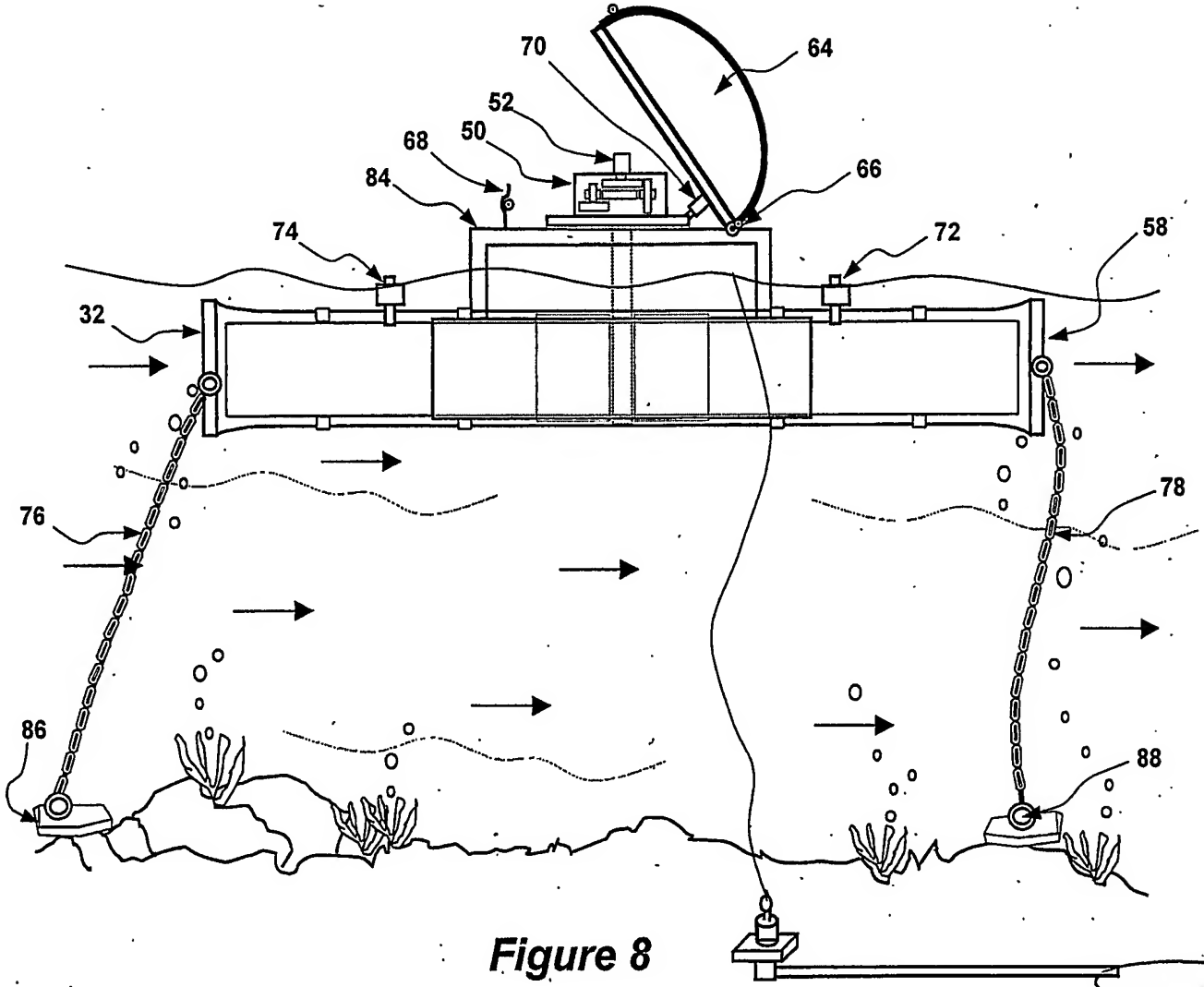

Figure 8

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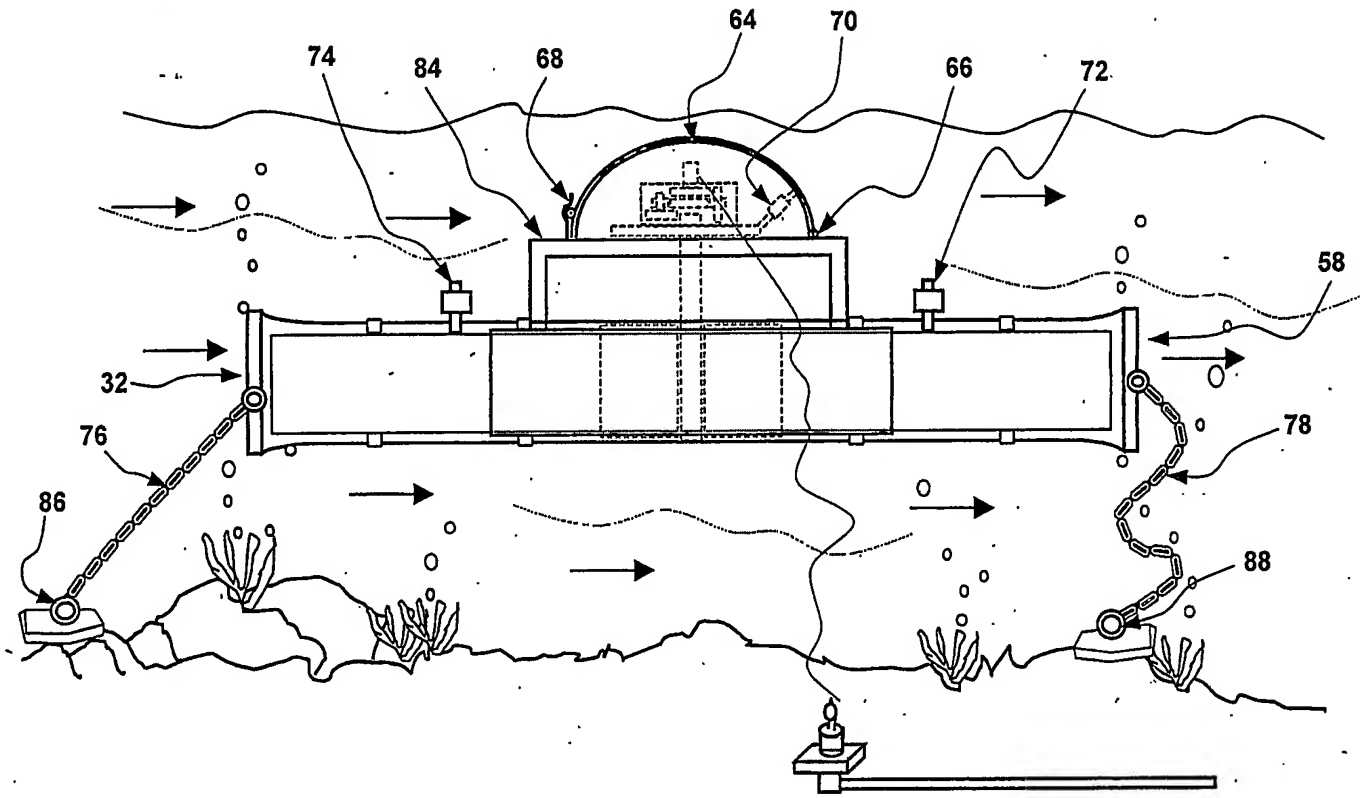

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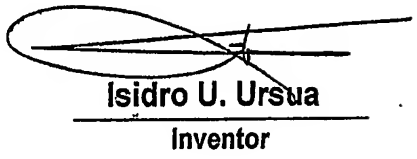

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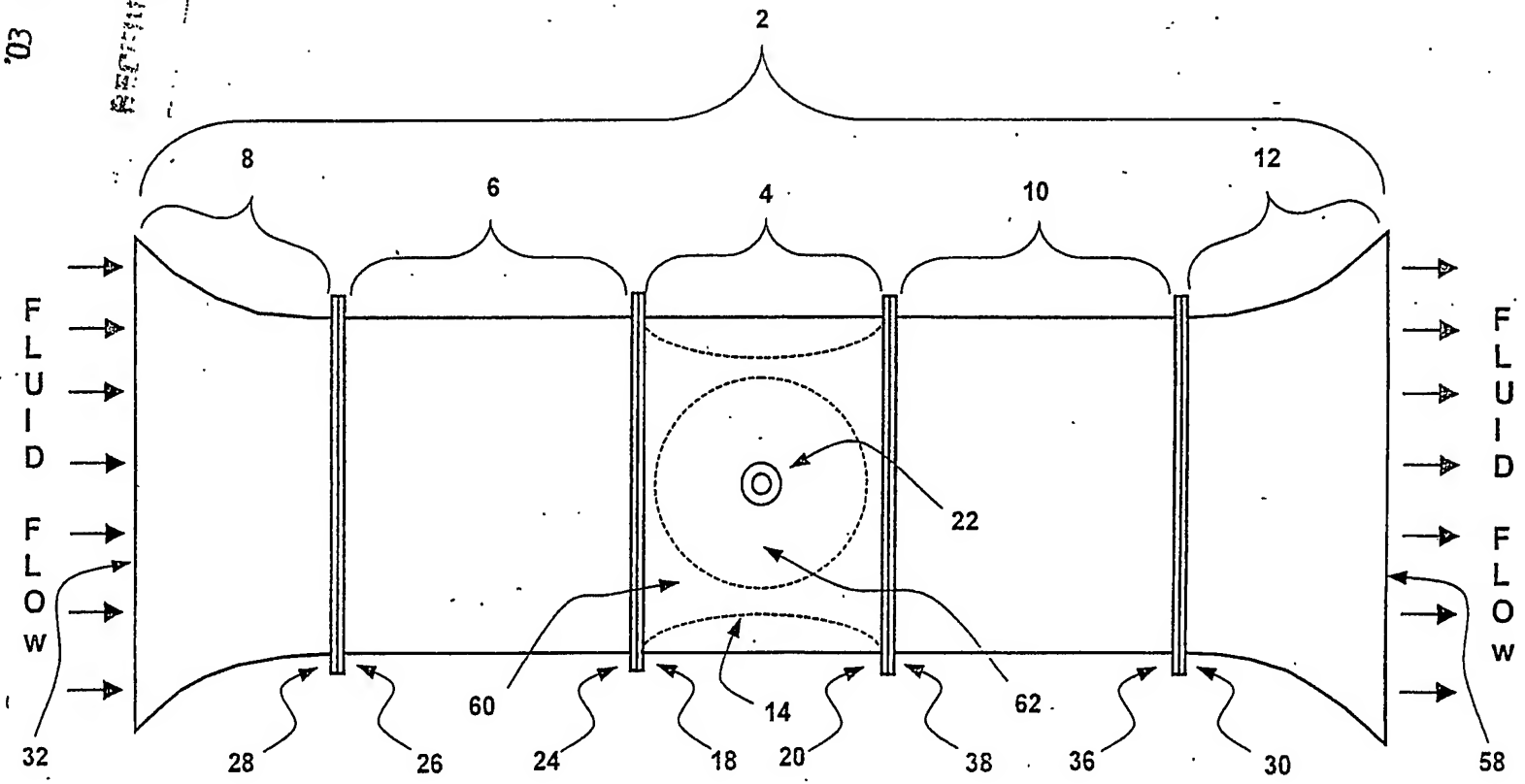

Figure 1

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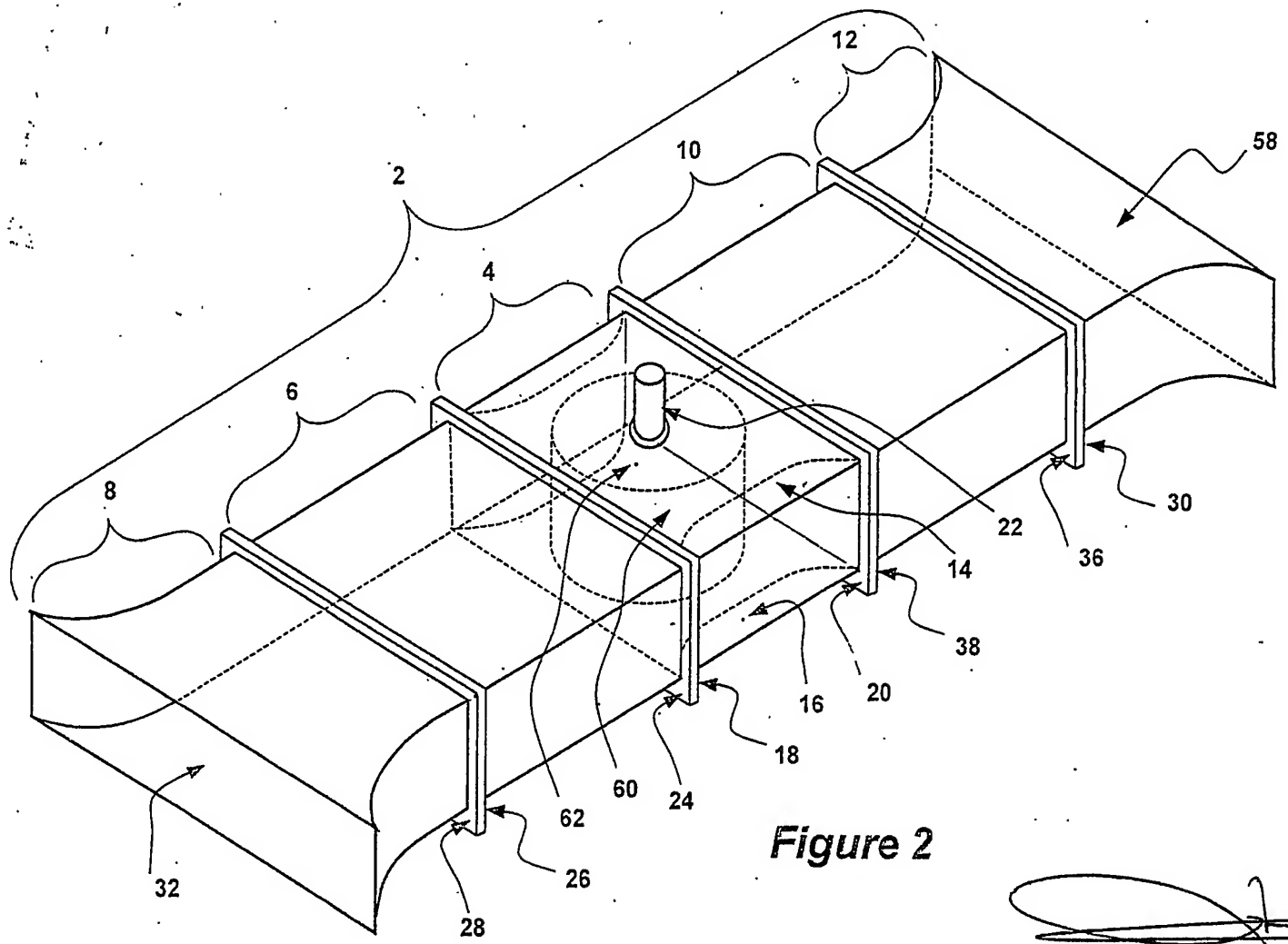

Figure 2

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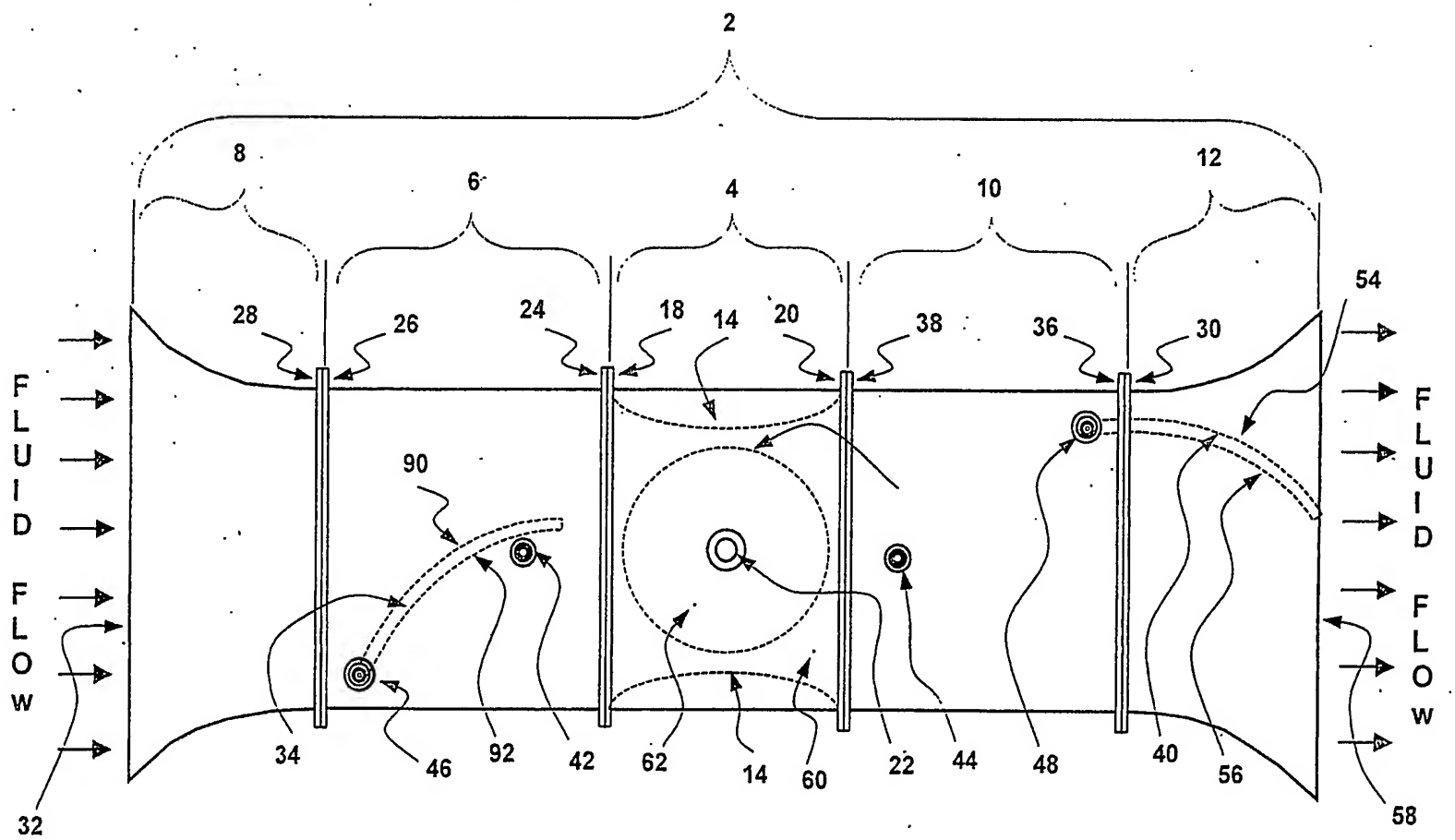

Figure 3

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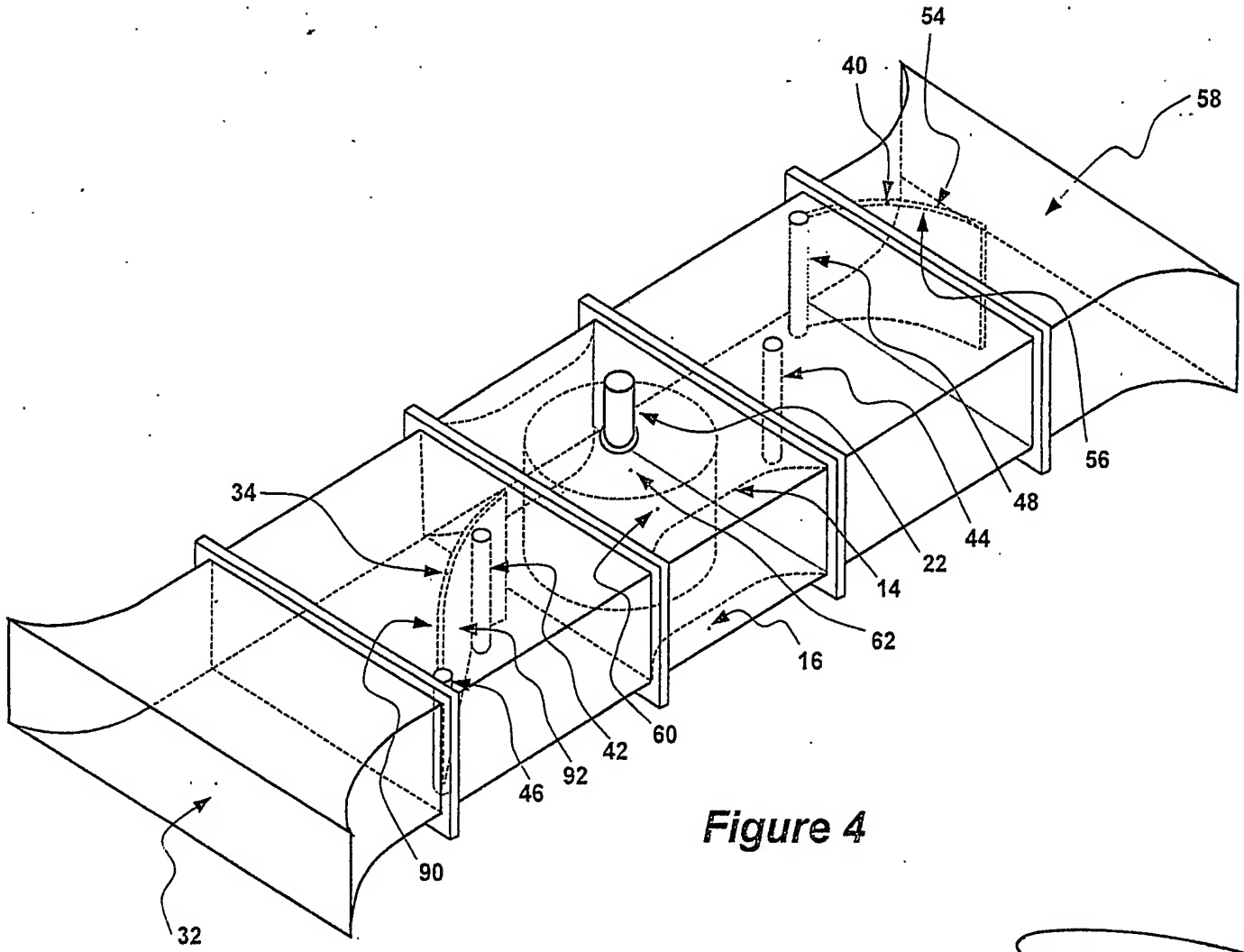

Figure 4

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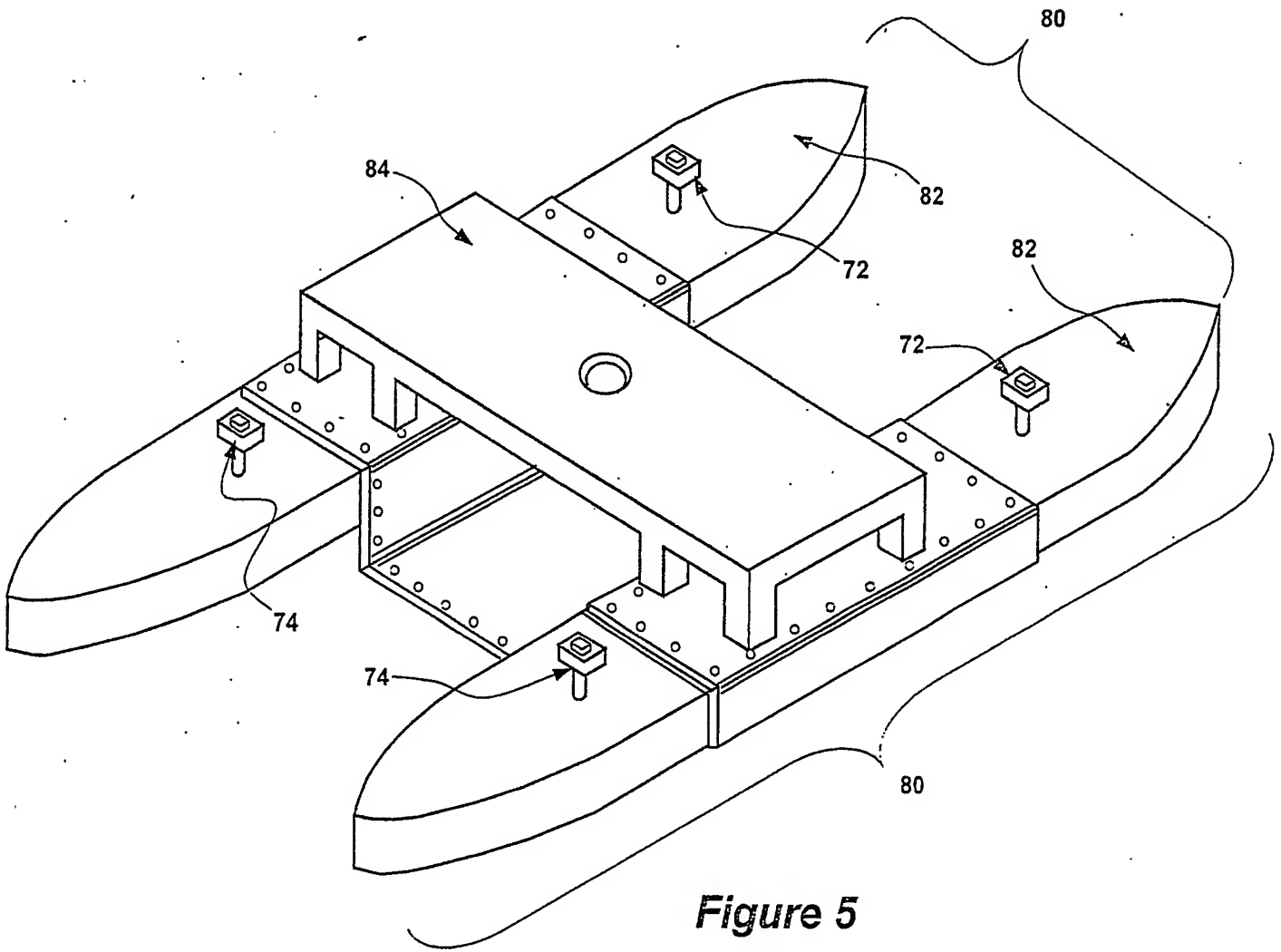

Figure 5

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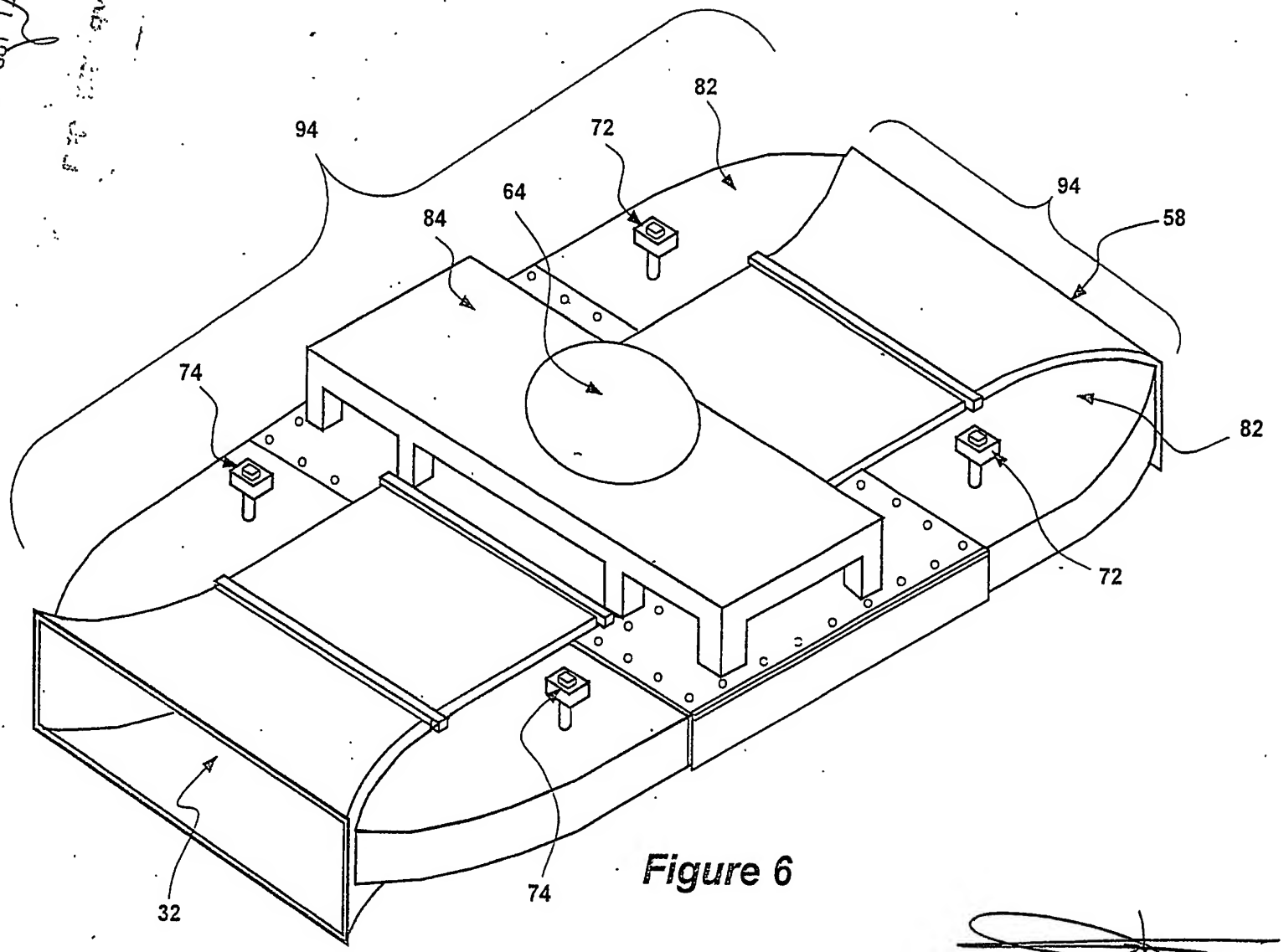

Figure 6

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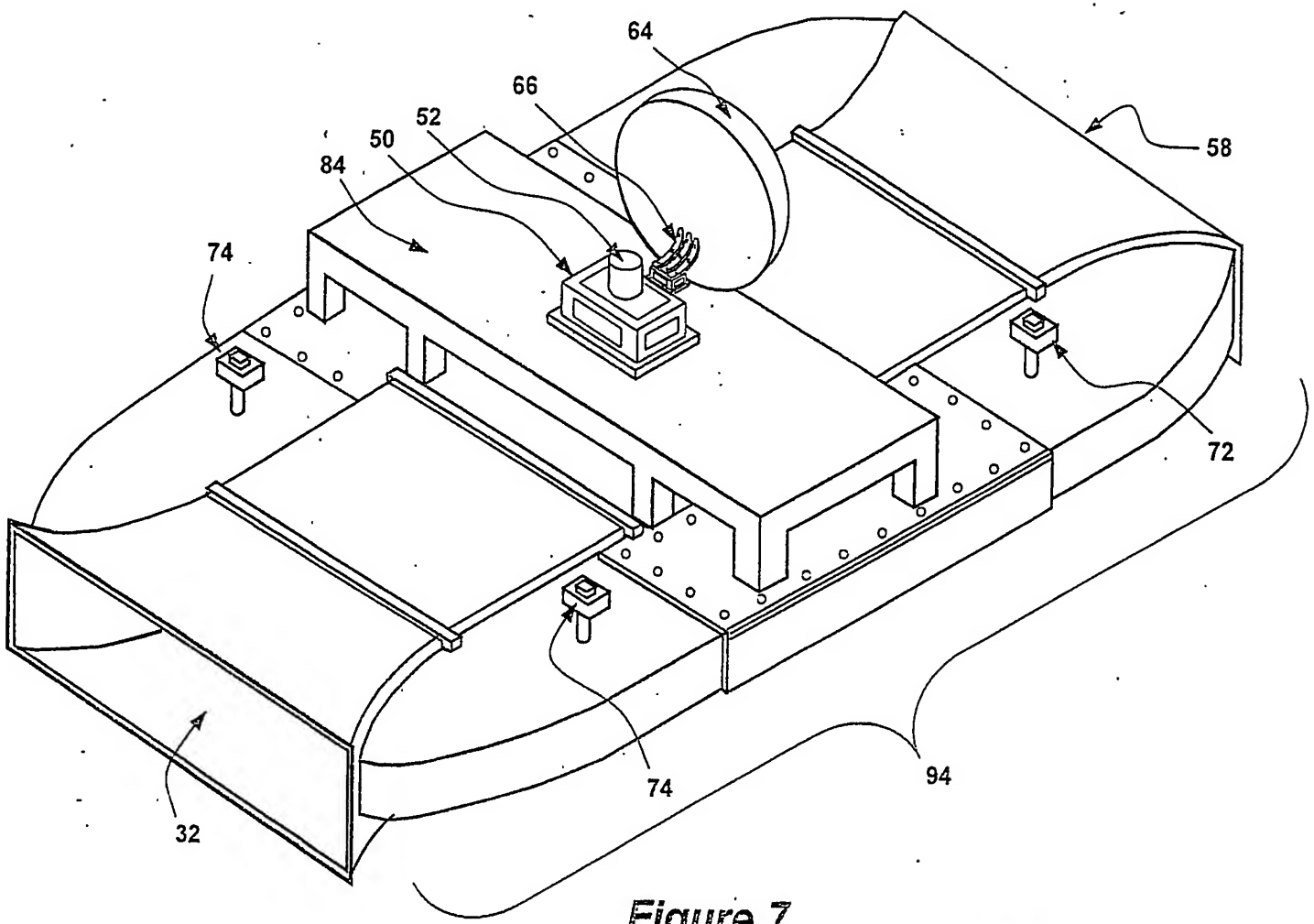

Figure 7

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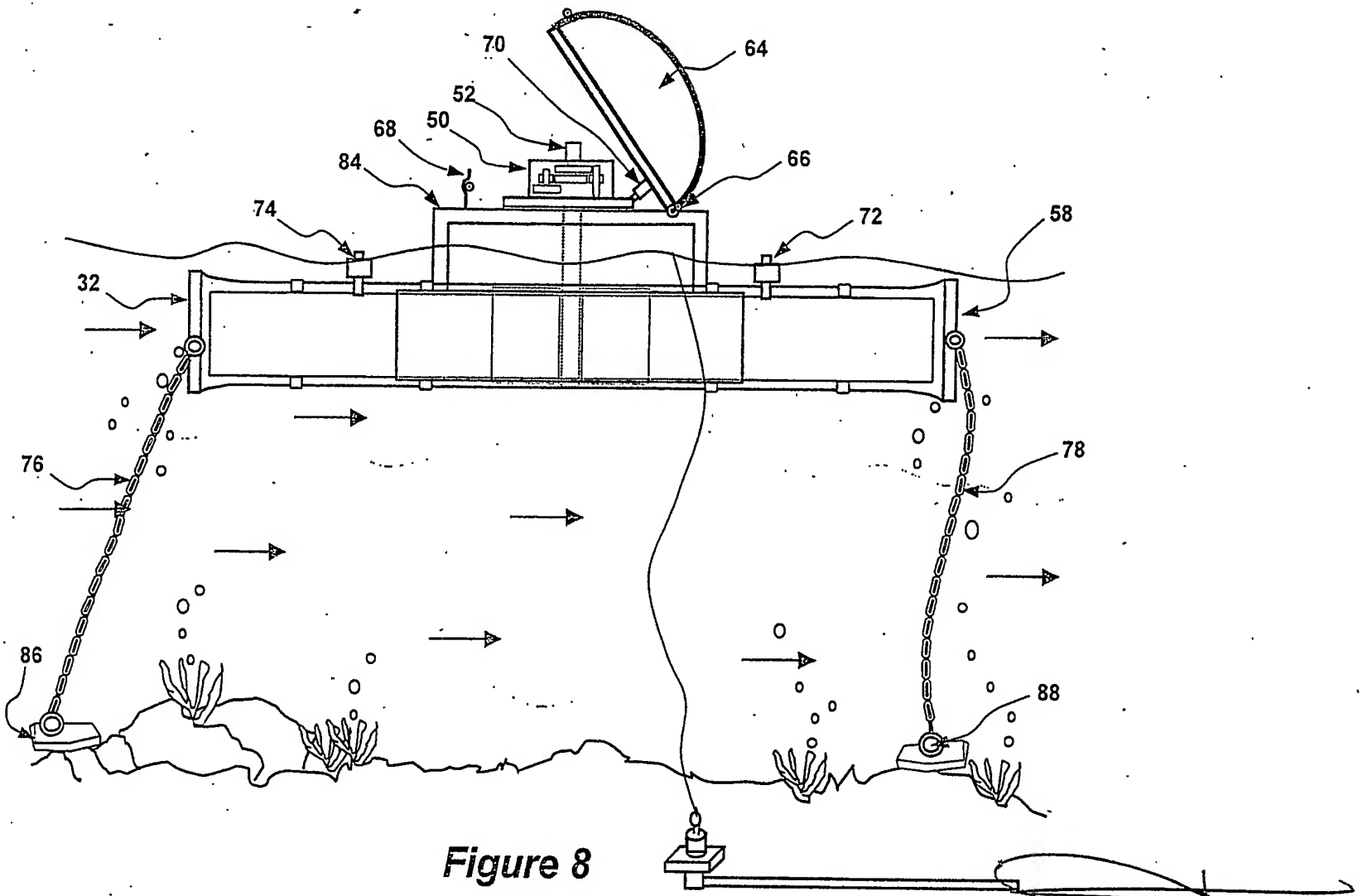

Figure 8

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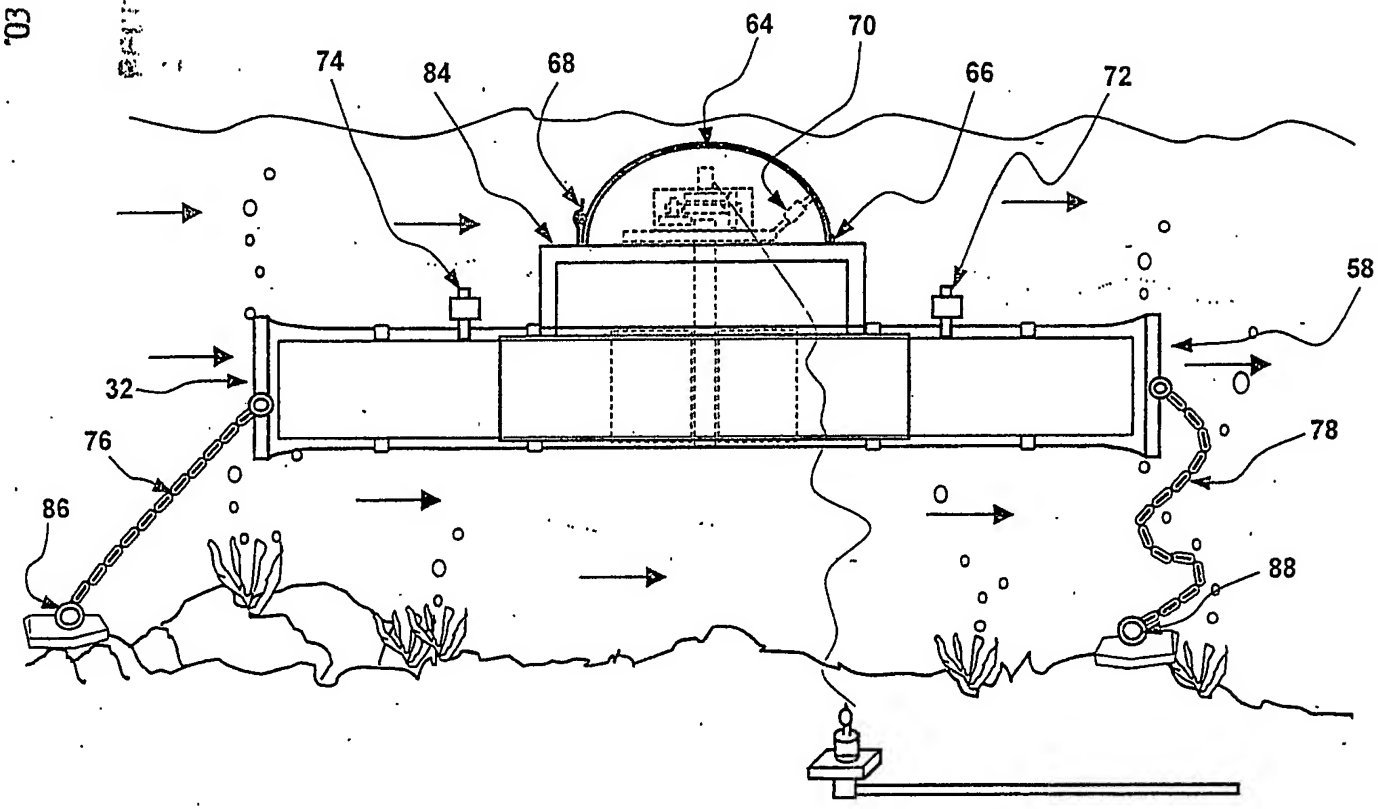

Figure 9

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